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SCIENCE NEWS LETTER

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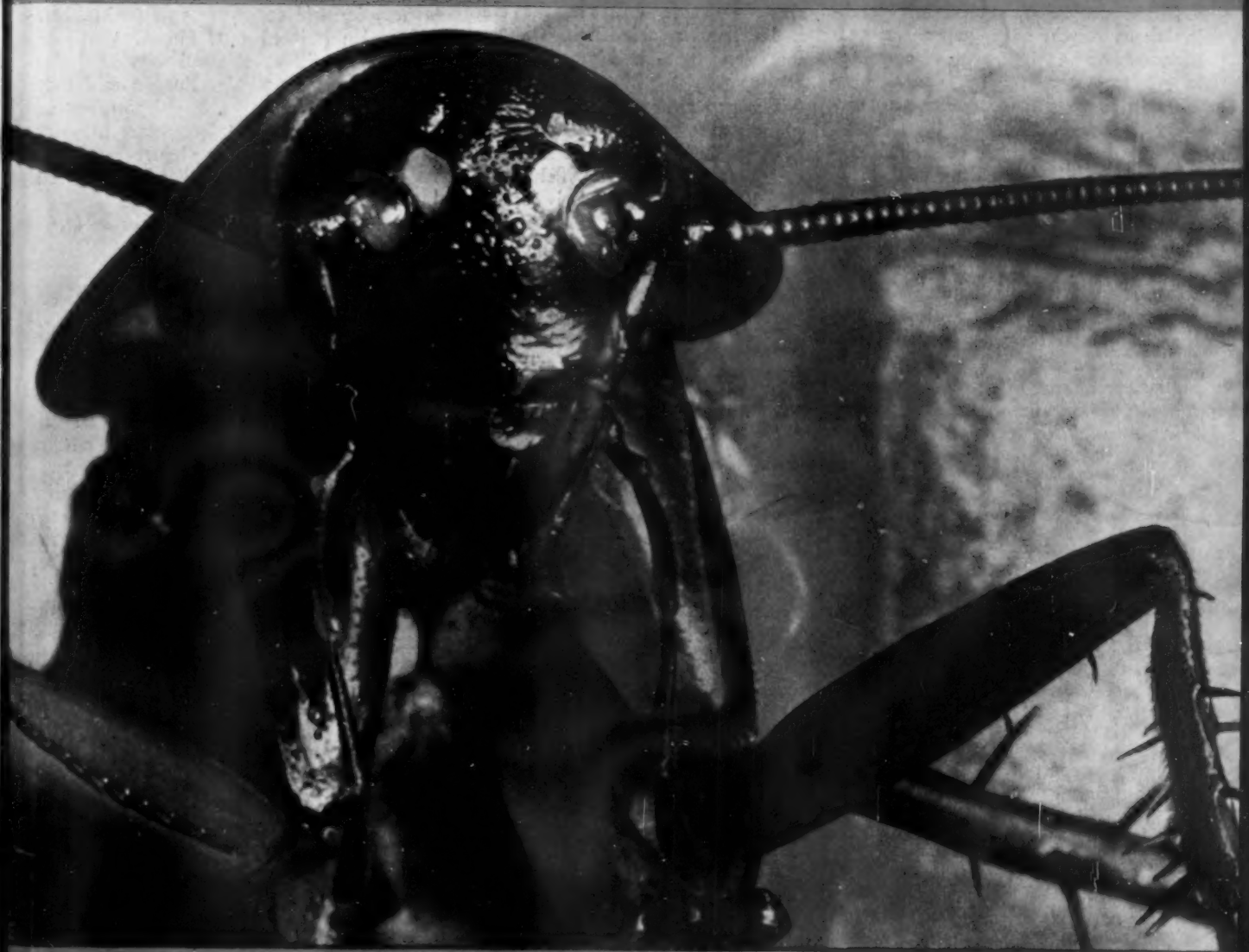
THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 5, 1944



DDT Worries

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A SCIENCE SERVICE PUBLICATION

CHEMISTRY

New Chlorine Process

Method by which chlorine dioxide, powerful oxidizing and bleaching agent, is now made is called "dry-production."

➤ A NEW PROCESS by which chlorine dioxide, powerful oxidizing and bleaching agent, can be produced has been developed by W. S. Hutchinson and D. K. Meecham of General Mills, Inc., (*Chemical and Engineering News*).

Chlorine dioxide is used for bleaching flour, starch, soap, paper and textiles. It also improves the water in public water supplies, checks blue mold in citrus fruits, and helps to preserve vegetables. Sterilizing the air with chlorine dioxide is believed to help increase the yield of the drug penicillin.

The new process for producing chlorine dioxide, called dry production, depends upon the reaction of chlorine and sodium chlorite. Advantages over the wet method are less lag in obtaining a steady stream of chlorine dioxide, and the elimination of water which is objectionable in some industrial operations and tends to cause corrosion and gumming in the chlorine system. The process is used by the Mathieson Alkali Works.

Chlorine dioxide is unstable, so that it cannot be produced in bulk and stored like many chemicals. It must be produced where it is to be used, for immediate consumption.

Equipment for the production consists of a generator that supplies chlorine and air, and a cabinet which houses the controls, gauges and other similar apparatus.

The generator consists of two vertical cylindrical towers. A mixture of chlorine gas and air is fed into the first cylinder, which is charged with flaked sodium chlorite. Chlorine dioxide is formed and carried to the bottom of the second cylinder, where the unreacted chlorine is oxidized, leaving the remaining chlorine dioxide chlorine-free. When the first cylinder is exhausted, after about 100 hours, the second cylinder is used for generating the gas, while the first cylinder is recharged. This permits continuous operation.

Science News Letter, August 5, 1944

AERONAUTICS

More Airports Needed

Postwar development of civil aviation will be seriously impeded unless double the number of present fields are constructed within five years after the war.

➤ THE CIVIL Aeronautics Administration will soon complete and present to Congress a report on studies it has made for postwar airports, showing that civil aviation will be seriously impeded unless double the number of present fields are constructed within five years after the war, it was announced by William A. M. Burden, Assistant Secretary of Commerce.

"The airport," he stated, "is the basis of all aviation development, just as the highway is the basis of all automotive development."

As a result of a three-year program of the CAA, costing $400,000,000, the United States now has 600 new or vastly improved airports, almost all of which will be used after the war for civil aviation. This brings to 3,086 the total number of airports in the country.

Since the growth of private flying and air transport is dependent upon the development of an adequate airport system, Mr. Burden declared that the CAA will show Congress that we will need double the number of fields within five or ten years after the war, plus improvement of 1,625 of the existing fields.

Out of the total number of new fields proposed, 2,900 will be small airports to be used for personal flying and local air service. At present there are only 286 places in the United States where the planes of scheduled air lines can stop. The CAA will recommend to Congress that 174 of these be improved for safe and efficient air transport service.

Mr. Burden pointed out that of the 720 new points in the U. S. for which air lines have made application to the CAA to serve, 612 require airport construction. Scheduled air line service will not, he added, be made available to all of these points in the immediate future.

The CAA plan will be worked out state by state. Massachusetts, for example, now has 54 airports. Under the CAA plan it would secure 36 new airports, at a cost of about $30,000,000. Half of these new airports would be of small size, suitable for personal flying. Minnesota would have 159 flying fields, as compared with 45 today. Since this territory is ideal for flying vacationists. Mr. Burden pointed out, 114 of the new fields would be of small size.

In conclusion, Mr. Burden said that the development of an airport system adequate for our air commerce in years of peace will insure our having a suitable system available immediately if needed for defense.

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ORDNANCE

Bazooka Made More Deadly By New Improvements

➤ BAZOOKA fire in future battles is likely to become increasingly accurate and deadly, as a result of several improvements in the American rocket weapon.

The rough wooden stock of the earlier model has been replaced by a skeleton steel frame, shaped to fit the user's shoulder better and to make handling of the weapon more convenient. The sight has been greatly improved and at the same time made more compact and less liable to damage by striking against trees or rocks. The rear section of the tube has been strengthened with a wire wrapping.

Carrying the original bazooka has always been a somewhat awkward job because of the considerable length of the tube. This difficulty has now been obviated by making the tube in two sections, with an easily locked, tight joint about halfway of its length. It can now be separated into two halves, and carried with three rounds of ammunition on the soldier's back. Also, for transportation in jeep, plane or glider, the long weapon can be reduced to more wieldy proportions.

Science News Letter, August 5, 1944

There are approximately 500,000 active cases of *tuberculosis* in the United States.

MEDICINE

Bleeding Disease Helped

There is now hope of saving victims of the strange Waterhouse-Friderichsen syndrome disease by prompt recognition plus intensive specific treatment.

➤ HOPE OF saving more victims of a strange, almost always fatal disease called Waterhouse-Friderichsen syndrome, is seen by Dr. H. B. Thomas, of York, Pa., and Dr. C. D. Leiphart, U. S. Public Health Service, New York City.

Prompt recognition plus intensive specific treatment are advised by the doctors in their report (*Journal, American Medical Association,* July 29).

The condition is one in which there is bleeding into the skin and internal organs, including the adrenal glands. Usually the patient seems to have a mild cold for a few days. Then suddenly he is very sick, with chills, sweating, fever, great weakness, general aching with abdominal pain or cramps and vomiting. Large black and blue spots, from the bleeding into the skin, appear very rapidly and the patient also becomes cyanotic. Death comes so quickly that the duration of the sickness is a matter of hours rather than days.

Cases of this strange illness are being reported more and more frequently. It is due, Dr. Thomas and Dr. Leiphart believe, to an overwhelming blood stream infection with a profound state of shock superinduced.

"Prompt, decisive and heroic measures" are called for in treating the condition, they state. Sulfadiazine, or as second choice sulfathiazole, should be given plus antimeningococcus serum. There should be no waiting to see whether the chemicals will be effective before giving the serum, and no waiting for blood cultures to identify the germ causing the trouble. Rapid diagnosis can be made by smears from the purple or black and blue spots where there is bleeding into the skin. Blood plasma, oxygen, adrenal cortex extract, fluids and salt should also be given to combat shock and keep up the patient's strength until the infection is overcome.

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AERONAUTICS

Mechanical "Ear"

A flight instrument tells the pilot when his plane in right side up and enables him to perform perfectly executed loops and slow rolls.

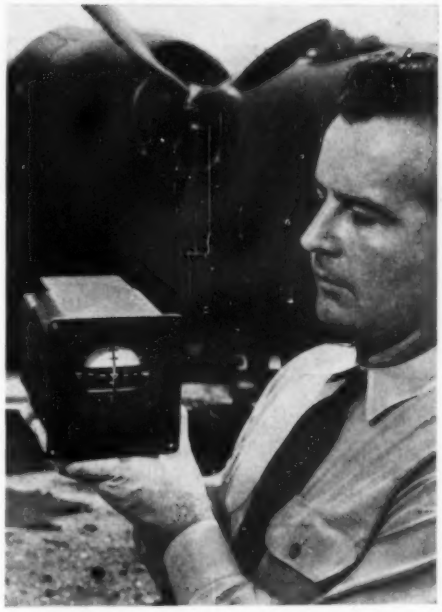
➤ A NEW FLIGHT instrument that tells the pilot when his plane is right side up (or otherwise) has been announced. It gives him a visual indication of the position of his plane in relation to the earth's surface throughout all possible positions through which his plane can be maneuvered. In tests, pilots were able to perform perfectly executed loops and slow rolls under a blackout hood.

For the first time in aviation history it is now possible for pilots to perform all aerobatic maneuvers without visual reference to the earth's surface, reports the Sperry Gyroscope Company, designers and builders of the Sperry Attitude Gyro.

A gyroscope is the secret of the new attitude indicator. It is a balanced flywheel electrically propelled at high speed around a vertical axis. Since the spinning gyro tends to remain in the same position and plane of rotation, the instrument provides a fixed reference pattern around which the airplane may be maneuvered in any direction.

The gyroscope, in this instance, is in the form of a stabilized sphere on which the reference pattern is marked with luminescent paint and is visible to the pilot through a masked opening in the front of the instrument case.

The upper half of the sphere is painted white, the lower half is black. Latitude lines in contrasting color, (white on black, black on white) are inscribed, with short 10 degree marks between, on the spherical surface. A vertical meridian line, also in contrasting color, gives roll angle indication. The lateral lubber line, also marked in alternate black and white, stretches across the center of the mask opening and provides the basic pitch index for reference to the pattern of the sphere.



***ATTITUDE METER**—This little gyro instrument tells the pilot which way is up and at what strange angle his plane is with reference to the surface of the earth. Thus, he can perform all aerobatic maneuvers without seeing the horizon.*

The only operating knob or adjustment required by the pilot is that for the "target," a small circle which adjusts up and down to compensate for change in trim of the plane for level flight.

Gyroscopes are the heart of many of the instruments that go into the modern fighting plane. The B-25 Mitchell bomber contains about 128 instruments, while the Flying Fortress has 323. Five of the most important instruments depend upon gyros.

Most important of these is the automatic or gyropilot which enables our aircraft to maintain straight and level flight on a set course. Most automatic pilots contain two vacuum-operated gyroscopes which control the elevators, rudder, and ailerons, thus automatically changing the attitude of the plane itself. There are other types of automatic pilots that work on different principles.

The other gyro-operated instruments include the gyroscopic turn indicator, the gyro artificial horizon, the gyro compass and directional gyro.

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RADIO

Communications Problem

There must be an international agreement after the war as to the allocation of radio wavebands. Without this, expansion of air travel and shipping will be impossible.

➤ NEED FOR a world conference at an early date after the war to discuss the allocation of radio wavebands to various types of communications, such as television, FM, radar devices, standard broadcast, and miscellaneous radio services was voiced by Commissioner E. K. Jett of the Federal Communications Commission.

"Progress in the field of communications has been greatly accelerated within the last two-and-a-half years," Commissioner Jett remarked, "and unless a conference is called soon after the war to determine just what portions of the radio spectrum will be set aside for the various types communications, we may have years of confusion among nations before the frequency allocations can be straightened out. Radio manufacturers are ready to produce equipment for the operation of a variety of radio services, including FM, television, and peacetime radar, as soon as materials and manpower become available, and we must be able to tell them what frequencies will be used internationally for these various services, or else they will proceed under present standards to produce sets which would not incorporate the latest improvements resulting from the advancement of radio during the war."

To illustrate his point, Commissioner Jett showed that if, for example, Great Britain were to set aside a certain section of the radio spectrum for the use of maritime radar anti-collision devices, and the United States were to set aside the same section for television, a British boat entering New York harbor on a foggy night, and using the radar detector at British frequencies to prevent collision, would disrupt television reception in New York, and the television would interfere with the effectiveness of the radar.

Without a mutual agreement between nations on the question of waveband allotment the vast expansion of air travel and shipping to all parts of the world would be impossible. All nations must join in a treaty, agreeing to set aside certain sections of the radio spectrum for aeronautical, shipping, and international public services, to mention only a few of the various types of services to be provided for.

Commissioner Jett revealed that plans are already under way for an inter-American radio conference to be held in Rio de Janeiro, possibly in 1945, to discuss and coordinate plans for allocating the wavebands as far as the North, Central, and South American countries are concerned. Originally it was decided to hold this conference last year. However, due to the rapidly changing picture resulting from wartime research and development it was decided that the conference should be postponed until a later date.

The State Department, in an effort to prepare the radio industry in this country for the big international postwar radio conference, has compiled a statement of proposals for frequency allocation, and is now in the process of distributing it to selected organizations in the radio industry. This report, known as the IRAC (Interdepartmental Radio Advisory Committee) proposals, is the result of many months of careful analysis of what frequencies are best suited for individual services.

Predicting an era of transitional broadcasting during which a large number of programs broadcast on the standard band will also be broadcast on FM, he stated that eventually the public would buy enough FM sets to support FM independently of standard band stations. This does not mean that FM will supplant all standard band stations as it is believed that the higher powered stations in the standard band will provide a primary service particularly to rural areas for many years to come.

Speaking of some developments which will play an important part in the peacetime years, Commissioner Jett said, "Engineers know that the principles of radar will be applied to many peacetime systems to enhance safety of life and property; for example, anti-collision devices which may be carried upon airplanes and ships. In addition it will be used in connection with the operation of many industrial devices both for safety and to speed up production. Fortunately, the industry, represented by the Radio Technical Planning Board, has been studying these postwar problems for more than a year and will submit recommendations to the government at an early date."

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To conserve *beef liver,* now the chief food used in Georgia's fish hatcheries, the State Fish and Game Commission is experimenting with the use of fish refuse, such as shrimp heads, crab residue and discarded fisheries products.

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MEDICINE

Less Vitamin C

Latest report states its only role is prevention and treatment of scurvy. Very small amount enough for prevention.

➤ VITAMIN C is good only for the prevention and treatment of scurvy, and for prevention only very small amounts are needed, in the opinion of two Navy doctors, Lieut. Michel Pijoan and Lieut. Comdr. Eugene L. Lozner, who discuss the subject extensively, (*New England Journal of Medicine,* July 6).

Lieut. Pijoan himself lived for 20 months on a diet as low in the vitamin "as could be comfortably endured." The daily intake of vitamin C averaged 16 milligrams, although 75 milligrams is the generally recommended daily allowance. He suffered no untoward signs or symptoms and a wound made in the back at the end of this period healed normally.

From this and a similar study by another scientist, the two Navy doctors conclude that no extra vitamin C is needed to speed wound healing in patients who do not have scurvy. They also disagree with the views held by some other scientists that vitamin C, beyond the amount needed to prevent scurvy, would be good for pyorrhea, rheumatic fever, tuberculosis or stomach ulcer patients on the Sippy diet.

The usual laboratory methods of determining whether or not a person is getting enough vitamin C are also criticized by the Navy doctors. They believe that, aside from actual signs of scurvy, the amount of vitamin C in the white cell-platelet layer of the blood or in the whole blood should be used as the measure, rather than the amount in the diet he has been following, or the amount in the cell-free plasma of his blood or in the urine.

"Not until a diet can be shown to produce a steady linear decline in the vitamin C content of the white-cell platelet layer or whole blood or to produce scurvy is one justified in calling the diet deficient," they state.

The idea that a very small amount of the vitamin is enough to keep a person in the best of health is borne out by a study Lieut. Pijoan made of a group of Indians. These people followed a fairly rigid diet both winter and summer. In spite of the fact that in winter their diet never supplied more than 15 milligrams of the vitamin, instead of the recommended 75 milligrams, no case of frank scurvy could be found.

On the subject of diet, the scientists add that the vitamin C value of foods given in standard food tables may be as much as 75% incorrect. These findings were made by Lieut. Pijoan and Lieut. Comdr. C. M. McCay.

"Because the cooking and processing of food effect a variable but at times considerable reduction in its antiscorbutic property," the scientists conclude, "it is indeed fortunate that the daily requirements are not great."

Science News Letter, August 5, 1944

SPEED—Horses in the steeplechase at the Aqueduct track in New York were "stopped" in their jump when photographed with a new fast film developed by the Eastman Kodak Company. The picture was said to have been made in 1/000 of a second at the lens opening F/16. The speed of the film made it possible to cut down the lens opening to this very small aperture which in turn gave the extreme depth.

PHOTOGRAPHY

High-Speed Film Developed For News Photographers

➤ A NEW high-speed film, believed to be the fastest film ever made for news photographers, is now in use for photography under extremely adverse light conditions at high shutter speeds.

Many of the pictures made at the recent political conventions in Chicago were made with this film. It can also be used for making pictures inside of theaters, street scenes at night, night baseball games and other sports, and indoor candid shots.

The new film has extremely high sensitivity to colors, and is recommended for good exposure latitude. Extreme speeds can be obtained by prolonged development. Over-development, however, will increase the graininess, which is caused by the clumping of minute silver particles in the exposed emulsion. The new sports film is developed in the same way as other press type films are developed.

The new film, a product of the Eastman Kodak Company, is marketed in standard sizes under the trade name Super Panchro Press Sports Type Film. It was placed on sale only two months after the original idea for the film, which is a modification of Super Pan-

chro Press Type B, was conceived in Eastman laboratories, and developmental work started on the film.

The Weston rating (used in setting exposure meters) of the new film is 200 daylight, 160 tungsten. This is more than twice as fast as the fastest films previously in use which have Weston ratings of 80 daylight and 50 tungsten. The manufacturers state that the ratings for the new film may be doubled with little danger of underexposure.

Science News Letter, August 5, 1944

MEDICINE

Cigaret Smoking Dangerous After Certain Injuries

➤ A WARNING against the habit of giving an injured soldier a cigaret if an artery has been injured appears in a report by Dr. Grace M. Roth and Dr. Charles Sheard, of the Mayo Clinic, and Capt. John B. McDonald, M.C., A.U.S., (*Journal, American Medical Association*, July 15).

In the case of artery injury, the scientists point out, segmental spasm of the artery is common and the constriction of blood vessels that cigaret smoking may cause in a person sensitive to tobacco may cause "irreparable damage."

Smoking of standard cigarets should also be avoided, they warn, by patients with disease of the small blood vessels lying near the surface of the body.

Effects of smoking standard cigarets and also those made of corn silk were tested on four men physicians and two women technicians between the ages of 22 and 41 years and all in good health. After smoking two standard cigarets the pulse rate increased, on the average, by 36 beats a minute. Average blood pressure increase was 19 millimeters of mercury for the systolic and 14 for the diastolic.

Changes in heart action appeared on electrocardiograms, basal metabolic rate increased and the temperature of toes and fingers decreased after smoking two standard cigarets. After smoking corn silk cigarets, these changes and those in blood pressure and pulse rate were either negligible or slightly in the reverse direction.

Blood pressure, pulse and electrocardiogram returned to normal within five to 15 minutes after smoking the standard cigarets but the temperature changes in fingers and toes persisted for half an hour or longer.

Science News Letter, August 5, 1944

MILITARY SCIENCE

World War I Weapon

A week before the armistice, the United States had a gyroscopically-steered flying bomb that in tests hit targets after flights of up to 35 miles.

➤ JUST A week before the armistice of the first World War, the United States had a "secret weapon," a gyroscopically-steered flying bomb, that in tests hit targets after flights of up to 35 miles.

This early version of the flying bomb, which may well be the forerunner of some of the weapons now coming into use in this war, was the development of a group of engineers, one of whom was Dr. Thomas Midgley, Jr.

Dr. Midgley, who since those days has invented tetra-ethyl lead for anti-knock gasoline and refrigeration chemicals, told of these early experiments at his home in Worthington, Ohio.

The bomb-carrying device was a small, unmanned airplane, powered with a four cylinder air-cooled V type engine, giving 40 horsepower for about 45 pounds weight, which was very good for those days. It carried a 50-pound bomb.

Its first flight was at South Field, Dayton, Ohio, 25 years ago last November. A year later 12 of these A.T.'s or aerial torpedoes, as they were called, were taken to Carlstrom Field, Arcadia, Fla.

"Totally inexperienced personnel tried to fly them," Dr. Midgley related. "This resulted in four crashes and one getting loose.

"The army then sent for some help from the group who had developed them. Following the arrival of this group, the rest were successfully flown except for two crashes, one due to trying out an idea of a local lieutenant and the other due to an 'excited' lieutenant colonel who released the ship before the gyro had been set. The rest dropped their bombs inside a 30-foot circle at three miles range.

"A further model was built from salvaged parts and set for 35 miles. It was followed by a DH-4 and movies were taken. It landed practically on its target. So far as I know it is still there. There was no great lack of accuracy but you couldn't get an old line artillery officer to admit it."

The originator of the main idea was Elmer Sperry, but this particular development was assigned to Dr. C. F. Kettering, then of Dayton, now in charge of research for General Motors and chairman of the National Inventors Council. It was developed by the Research Division of Dayton Metal Products which later became the Research Laboratories of General Motors, in collaboration with Dayton Wright Airplane Company. Orville Wright was chief consultant. Harold Wills, then with Ford, developed the engine.

Experiments were continued by Elmer Sperry on his own, until his death.

Dr. Midgley was Dr. Kettering's assistant in this work, being specifically in charge of instrumentation and coordination and he went to Florida at the Army's request to fly the aerial torpedoes at Carlstrom Field.

A photograph of this flying bomb obtained from the U. S. Army Air Forces was published (*SNL*, Jan. 1, p. 7) and when it came to the attention of Dr. Midgley, he recounted the early history and called attention to inaccuracies in the caption.

Science News Letter, August 5, 1944

MEDICINE

Unique Club for Patients Who Have Lost Larynx

➤ A UNIQUE club, composed of 100 men and women who have had their larynx, or speech organ, removed, has been organized at the National Hospital for Speech Disorders in New York, Dr. James Sonnett Greene, founder and medical director, announced.

The name of the club, Anamilo, which is Greek for "I speak again," tells the reason for the club's founding. A patient who has had his larynx removed must learn to speak again, either by using a mechanical device or artificial larynx, or by substituting an esophageal voice.

A special committee of the club has been formed to call, on the request of the attending surgeon, on patients in the metropolitan area who face larynx removal or have just had the operation. A visit from an Anamilo member is said to give much-needed reassurance to others about to have the larynx removed. Cancer is responsible for the loss of the larynx in most cases.

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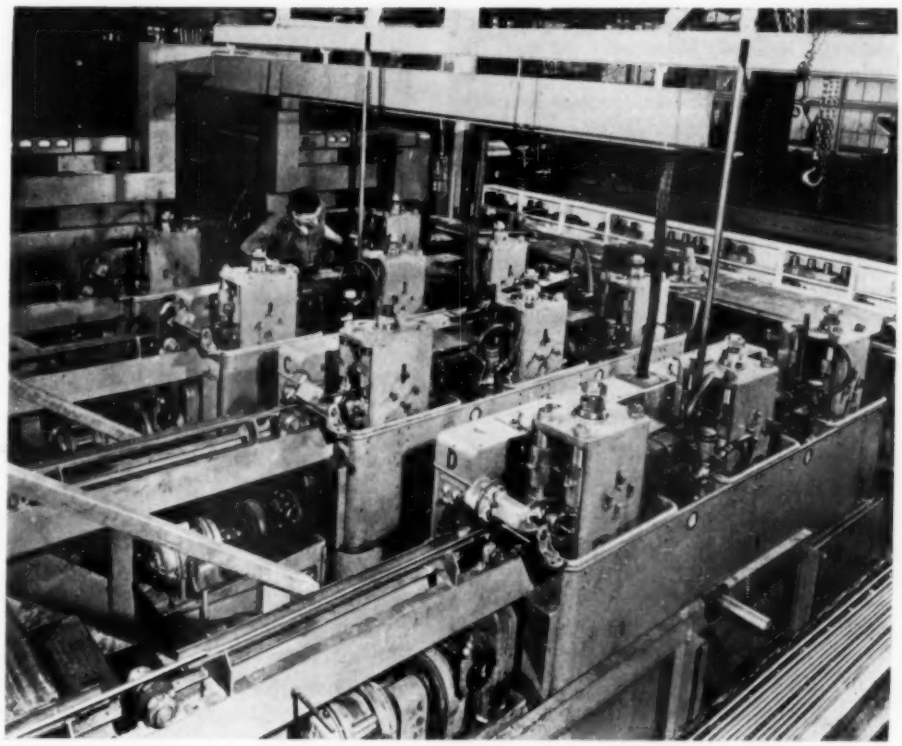

AUTOMATIC—One has merely to push a button to accomplish hardening of steel bars by the continuous heat-treatment method shown in this Ohio Crankshaft Co. photograph. Bars enter from the left; speed controlled rollers are located in the three housings upon the unit base. Between are the induction heating coils, one for hardening and the other for drawing.

ENGINEERING

"Push-Button" Hardening

A continuous heat-treatment method, employing high frequency induction, accomplishes the hardening of steel bars. One ton produced every 120 minutes.

➤ ONE HAS only to push a button to accomplish the hardening of steel bars by a continuous heat-treatment method employing high frequency induction. The new method was developed by the Ohio Crankshaft Company, and they report that the method will permit a saving of $15 a ton in production costs. This is 50% cheaper than production by conventional methods.

Bars hardened by high-frequency induction have improved machinability, because of complete uniformity of hardness and the elimination of hard spots.

With the new equipment, bars of steel from 0.5- to 1.25-inch outside diameter are passed through two water-cooled inductor coils by a special roller mechanism. The bars move continuously at a controlled speed. The first inductor coil is for hardening, and the second for drawing.

Typical of the functioning of this equipment is the hardening of ⅞-inch bars. The bars are fed through the hardening unit, where each bar is heated throughout its cross-section to 1600 degrees Fahrenheit. They are then quenched by water at a temperature of from 80 to 90 degrees Fahrenheit, under 60 pounds pressure. The bars then pass through the second coil where they are drawn at a temperature of 1125 degrees Fahrenheit, after which they are cooled by water again to facilitate handling. The bars pass through the units at a speed of 22.8 inches a minute. The ultimate production of an installation of four sets of the new equipment is one ton every 120 minutes.

The bars average 18 to 24 feet long, although there is no limit to the length of the bars which the equipment will handle.

Natural gas is introduced into the inductor coils to provide an inert atmosphere for the prevention of scale.

It is estimated that one man can handle the entire installation of four units with ease.

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CHEMISTRY

Hollow Metal Pillars Developed for Builders

➤ STRONG HOLLOW metal pillars covered with an extremely thin layer of plastic, finished and colored to resemble the rarest and most beautiful marbles, polished wood or other material, will be one of the available products for builders after the war. They have become possible with the development by the Goodyear Tire and Rubber Company of a method of bonding the plastic to the metal with the aid of a new organic cement known as pliobond.

This cement was made originally as a means of bonding wood to metal. Recent laboratory developments now make it usable to bond any two materials together. With it wood, rubber, plastics, cloth or leather can be firmly bonded to metal or other materials.

Some of the advantages of the new cement are that it is easy to apply, possesses high adhesion, is waterproof, and provides a flexible bond that will not crack. It is unaffected by the most severe climatic temperature changes.

Science News Letter, August 5, 1944

MATHEMATICS

Mexican Mathematicians Meet at Mining Center

➤ THE MEXICAN Mathematical Society has held its second meeting in Guanajuato City, a mining center with considerable scientific tradition.

Prof. Solomon Lefschetz of Princeton University, now lecturing at the University of Mexico's Institute of Mathematics, was the guest of honor and lectured on topology.

Governor Ernesto Hidalgo of the state of Guanajuato sponsored the meeting, attended by many of the leading Mexican mathematicians.

Science News Letter, August 5, 1944

MEDICINE

Skin Irritation from Contact with Penicillin

➤ THE FIRST case, apparently, of skin irritation from contact with penicillin is reported by Major H. D. Pyle, M. C., A. U. S., and Dr. Herbert Rattner, of Chicago, (*Journal, American Medical Association,* July 29).

The skin trouble developed in the medical officer in charge of the penicillin section of the Gardiner General Hospital. Three hospital corpsmen who have handled penicillin also have at times experienced slight discomfort from itching of the skin, but no signs of dermatitis.

The penicillin itself, not the medium on which the mold was grown, was responsible for the trouble in the officer, tests showed.

Science News Letter, August 5, 1944

OPTICS

Exact Center of Your Eye Is Partially Colorblind

➤ THE CENTER of your eye is partially colorblind, it is indicated by experiments conducted by Dr. E. N. Willmer, of the Physiological Laboratory, at Cambridge University.

If you look directly at a colored object that is so small that you see it only with the center of your eye, you will not be able to tell with any certainty whether it is blue or green, orange or purple. This would be important in observing and interpreting colored signals, because any object becomes small when it is seen at a great enough distance.

You can try it out yourself with an experiment described by Dr. Willmer (*Nature,* June 24). Draw a small circle, two centimeters (about three-quarters inch) in diameter. Divide the circle into four equal parts and color them green, light blue, orange-brown and light red-purple. Set your circle up about ten feet (three meters) away from you. If you have normal color vision you will have no trouble distinguishing the green from the orange, but you will find that if you look directly at the center of your circle, you will have trouble in telling the blue from the green or the orange from the purple.

But now, instead of looking at the center of the circle, fix your eyes on a point about an inch and a quarter away. Then, all the four sections will stand out in their true colors, Dr. Willmer predicts.

The results of this experiment have implications for the theory on how we see colors. Dr. Willmer believes that the center of the eye's fovea may not contain only the night-blind, color-sensitive visual organs known as cones; it may have also those known as rods, but these would be rods differing from those in the surrounding parts of the fovea in that they cannot accumulate visual purple and become adapted for seeing at night. If these rods depended upon visual purple, but did not accumulate it then they would be defective in color vision in the way demonstrated by this experiment.

Science News Letter, August 5, 1944

ORDNANCE

Cost of Small Arms Nearly Halved Since 1941

➤ COST OF small arms and their ammunition has been cut nearly in half since 1941, an analysis reveals, (*Army Ordnance,* July-Aug.). The exact figure, 48%, was obtained by Maj. A. R. Coleman, chief of the price analysis unit, Small Arms Branch, Ordnance Industrial Division, after exhaustive study of production-cost figures on 15 small-arms items, including rifles, carbines, machine-guns, tommy-guns and ammunition for all of them.

Costs were high on all new items, and came down as plants were tooled up and personnel acquired "know-how," the study shows. Raw-material costs have for the most part remained steady or declined very little, so that this factor has not figured greatly in economies achieved.

As a single example in saving of labor; a graph of man-hours expended directly in the making of a Garand rifle shows a figure of about 23 in 1939, a little more than 12 in 1941, and approximately six in both 1943 and 1944.

Science News Letter, August 5, 1944

AERONAUTICS

Removable Belly for Use On Cargo Plane Patented

➤ A NOVEL cargo plane, with its whole belly or "hold" removable, is put forward by John H. Hooker of Miami, Florida, for patent 2,352,323. The entire operating part of the plane—cab for pilot and a few passengers, control mechanisms, etc.—lies in the upper part. The idea is that the plane can alight, have its whole cargo carrying portion removed, a new one with fresh cargo attached, and take off again with minimum loss of time sitting on the ground.

Science News Letter, August 5, 1944

IN SCIEN

ENTOMOLOGY

Cabbage-Worm Pest Is Successfully Attacked

➤ LEND-LEASE aid from the United States to New Zealand, on science's front against the ceaselessly attacking hordes of insect enemies, is reported (*Nature,* July 1). The Americans have sent a swarm of small but doughty flying allies to the "down-under" islands, to be loosed against the cabbage-worm, destructive enemy of cabbage and all related crops wherever grown. Cabbage worms are the caterpillars of the common white cabbage butterfly.

The American aid consisted of thousands of tiny, wasp-like insects, that deposit their eggs in the caterpillars' bodies. The hungry little larvae burrow from within, feeding on the victim's body tissues and killing great numbers of them.

Curiously enough, a similar "planting" of the parasitic insects from England, made a few years ago, was not successful. The American species seems to have found New Zealand conditions better suited to its life habits.

Science News Letter, August 5, 1944

CHEMISTRY

Aluminum Now Available For Manufacture of Cans

➤ ALONG ABOUT the first of the year, or a little earlier, expect to see tooth powder, tobacco, cocoa, medical tablets, ointment and a few other things packed in shiny aluminum cans and boxes.

Because aluminum is now relatively more available than sheet steel, the WPB has made available about 7,000,000 pounds of this white, light metal for what is called "experimental" manufacture of containers.

There will also be large sized cans of aluminum for baking powder, lard, malted milk, pretzels, crackers, biscuits and potato chips, and the door is left open to allow special manufacture of aluminum cans for other products during July, August and September.

Paper and cardboard have been used for packing some of the products that can now be merchandised in aluminum.

Science News Letter, August 5, 1944

E FIELDS

MEDICINE

Infantile Paralysis Cases Increase Chiefly in East

➤ INFANTILE PARALYSIS cases continued to increase, a total of 568 being reported to the U. S. Public Health Service for the week ending July 22. This is 106 more than reported during the previous week.

Chief increases were in the east. In New York City and State cases increased from 93 to 153, in Pennsylvania from 31 to 56, in Michigan from 10 to 24 and in Kentucky from 67 to 77. Maryland reported 10 cases and the District of Columbia 8. In North Carolina, where the outbreak started earlier, cases dropped from 63 to 62 and in Virginia from 39 to 30.

Science News Letter, August 5, 1944

MEDICINE

Milk Protein Product Fights Malnutrition After Burns

➤ MALNUTRITION following extensive burns, such as may be experienced by surviving victims of the circus fire at Hartford and other civilian and war disasters, may be treated by a pre-digested milk protein product, it appears from studies by New York University College of Medicine scientists.

The scientists are: Dr. Co Tui, Dr. Arthur M. Wright, Lt. Col. John Mulholland, now overseas as chief of surgical service of the Bellevue Hospital Unit, Dr. Irving M. Barcham, Dr. Ernest S. Breed, and Dr. Vincent J. Vinci.

The milk protein product, marketed under the name of amigen, fights malnutrition by serving as a source of nitrogen. About one pound daily given by mouth replaced as much nitrogen as would a daily intake of four and one-half pounds of lean meat or 23 units of blood plasma, the New York University scientists found.

A study of 109 victims of the Cocoanut Grove disaster in Boston showed that all patients with 10% or more of the surface area of their bodies involved in third degree burns became serious nutritional problems. The reasons for this were the loss of nitrogen and the increased requirement for nourishment resulting from infection with fever.

Chief factor in the loss of body weight after severe burns, the studies show, is the loss of nitrogen which can only be replaced by protein intake. In extensive burns, nitrogen escapes through intertissue loss into the burned area, in the substance which oozes from the burned area, increased loss through body excretions and loss through inability of the damaged body to digest proteins.

Science News Letter, August 5, 1944

INVENTION

Cotton-Picking Machine Runs Backward for Accuracy

➤ A COTTON-PICKING machine that normally runs backward is the invention on which A. W. Scarratt, D. B. Baker and C. R. Hagen, all of the Chicago region, have received patent 2,352,291, which they have assigned to the International Harvester Company.

Reason for the seemingly bizarre mode of operation is the fact that the operator must be able to "aim" the opening, or throat, of the picker accurately at the row; and the only way in which this picker can be mounted directly on the frame of a three-wheel tractor is with the throat projecting between and behind the rear wheels. Driver's seat and steering-wheel are of course rearranged for the convenience of the operator.

Science News Letter, August 5, 1944

STATISTICS

Drowning Deaths Have Been Halved Since Last War

➤ DEATHS BY drowning have been cut almost in half since the last war, statisticians of the Metropolitan Life Insurance Company report.

Among the company's white male industrial policyholders, aged one to 74, the standardized death rate from drowning in the war years 1942-1943 was 9.9 per 100,000, or 42% below the 17.2 rate prevailing during the last war. Drownings among females also have decreased.

The present annual drowning toll of about 7,000 lives could be further reduced, it is suggested, by intensifying efforts to get people to learn to swim and to follow the rules of water safety, whether swimming, boating or at work where drowning is a hazard.

About four out of every five persons drowned are non-swimmers or poor swimmers, it appears from a study among men university students.

Science News Letter, August 5, 1944

INVENTION

"Popcorn" Process Fluffs Cellulose for Many Uses

➤ FLUFFING up cellulose acetate and similar plastic materials until it is puffy and porous like popcorn, useful for lifebelts, cushions, mattresses and felt-like insulation, is the basis of the process on which patent 2,354,260 has been issued to Dr. C. I. Haney and M. E. Martin, both of the Celanese Corporation of America, with headquarters at Cumberland, Md.

The process is basically very simple. The cellulosic compounds are merely soaked in some volatile liquid, like alcohol or gasoline. Then they are placed under high pressure, on the order of three tons per square inch, and the temperature raised to 200 degrees Centigrade—100 degrees above boiling point. When the pressure is suddenly removed, the cellulosic particles blow up like popcorn grains. The material is exceedingly light, having a density only about one-tenth that of water.

Science News Letter, August 5, 1944

GENERAL SCIENCE

Kharkov Scientists Work To Restore Damaged Cities

➤ SCIENTISTS of Kharkov are in the front rank of those working on the restoration of that city that bore the brunt of Nazi destruction.

In addition to general technical aid in order to facilitate production in restored industries, the scientists are setting up plant laboratories and conducting laboratory training courses. Institutes are also being held in chemistry, mechanical engineering, civil engineering, and power plant engineering.

Chemists are making analyses needed by the newly restored plants and mills. The metal testing laboratory organized by Kharkov State University is helping the construction engineers.

Geologists under the guidance of Prof. Dmitri Sobolev are making the mineral resources of the Ukraine available for the reconstruction.

Scientific and engineering laboratories of most of the Kharkov enterprises were completely demolished. The Kharkov Engineering Institute has placed its own laboratory at the disposal of the industries and the Kharkov Power Engineering Institute staff is participating in the restoration of the electrical system and power plants of the city.

Science News Letter, August 5, 1944

CHEMISTRY

Insect War May Backfire

The chemicals used for killing insects may harm as well as help. DDT checked a dangerous epidemic of typhus fever in Italy, and may soon be available to civilians.

By JANE STAFFORD

See Front Cover

➤ THE NEW chemical weapons for our war against insects that destroy crops and spread human disease are turning out to be double-edged weapons. There is danger of disastrous backfire from this kind of chemical warfare just as there is in the gas warfare which military authorities hesitate to use.

The insects—mosquitoes, lice, boll worms, beetles, flies and roaches, like the one shown on the cover of this SCIENCE NEWS LETTER—cannot turn on us with a gas attack of their own death-dealing dusts and sprays, it is true. But our own weapons threaten us in this war. They may at the same time destroy both useful and harmful agricultural insects. They may rid your dog of fleas, but insidiously, and perhaps fatally, damage his liver or paralyze him through nerve damage. They will rid your home of mosquitoes, flies and vermin, but the price may turn out to be high in human health and life.

These double-edged weapons are the new insecticides. Best-known of them is DDT, the anti-louse powder that checked a dangerous epidemic of typhus fever in Italy. Our troops had typhus protection from the vaccine, previously untried under epidemic conditions, which was devised by American scientists just before the war. The Italian people had no such vaccinations and the DDT powder kept them from being ravaged by typhus, long a scourge of war. The DDT dust kept troops and civilians free of lice, and scientists are betting the vaccine was also effective, which history will judge. At any rate, the new insecticide won its battle and helped win a campaign.

Pre-War Rotenone

Before the war, an insecticide was, to the average layman, something to spray or dust around the house to rid it of flies, mosquitoes or roaches. Most of them, though the layman probably did not know it, were made of rotenone and pyrethrum, substances extracted from tropical roots and poppy-like flowers. The pre-war layman generally knew, too, that the whitish film he sometimes found on apples was an arsenate spray used to protect orchards from insect pests. He may also have known that paris green was dusted on swamps and pools to cut down mosquito breeding.

Then came the war and the need for more food. Victory gardens turned hundreds of thousands of lay men and women into small-scale farmers and brought them face to face with the insect pests that destroy crops. War also brought the threat of deadly, louse-borne typhus fever and mosquito-borne malaria to millions of American sons, fathers, husbands and sweethearts. And war stopped the imports of rotenone and pyrethrum for fighting mosquitoes and insects that destroy crops.

Most of us had no idea how near we were to losing the war against insects and the disaster that uncontrolled hordes of crawling and flying disease carriers and crop destroyers might have brought. While we were giving thanks to our chemists for newer and better sulfa drugs and to other scientists for plasma and penicillin to fight germs, another group of scientists were working quietly behind the scenes to give us weapons against our insect foes.

First of these new weapons to be publicly acclaimed was dichloro-diphenyl trichlorethane, nicknamed DDT. It was synthesized in 1874 by a young German chemistry student, Othmar Zeidler, in Strasbourg. He made it almost as a chemical stunt, something as a cook might develop a new recipe for a cake or pudding, and he apparently had no idea that his chemical had any insect-killing powers.

DDT was buried in a German Chemical Society report until a few years ago when Paul Muller, scientist of J. R. Geigy, chemical manufacturing firm in Basle, Switzerland, discovered its properties as an insect killer. Even then, it was a crop pest and not human disease that brought DDT out of obscurity. It saved the Swiss potato crop, threatened in 1939 by Colorado potato beetle, and

DAILY TREATMENT—DDT sprayed on 70,000 people each day as shown in this U. S. Army Signal Corps picture quelled a typhus epidemic in Naples.

FLIES COUNTED—The effectiveness of household sprays is checked by an actual count of the flies killed.

was soon found to have other agricultural value.

The Geigy firm states that its scientists also discovered DDT's power to kill body lice, which spread typhus fever. When the United States entered the war, the Geigy product was brought to the attention of American military and agricultural authorities.

The tale that the first DDT available in the United States was smuggled out of Switzerland appears to be more romantic than true. A quantity of the potent insect killer was sent openly from Basle to the firm's offices in New York as a regular business transaction. It came in the form of the agricultural insecticide, under the trade name of Gesarol. The New York offices did not then know its chemical structure.

Synthesized by U.S.D.A.

The active ingredient was extracted and later synthesized by U. S. Department of Agriculture scientists who tested it in experiment stations all over the country. At the same time, military authorities in great secrecy investigated its anti-louse property.

Today DDT is being produced in large quantities by a number of firms in the United States. Production has expanded to the point where all military needs are expected soon to be met and there is hope that limited civilian distribution for essential needs may be possible later this year.

DDT is used as a body-dusting powder and as an emulsion to impregnate clothing in fighting lice and typhus fever. It is active not only against lice and agricultural pests but also destroys mosquito larvae, fleas, flies, moths, roaches, bedbugs and silverfish.

Health Hazard

"The toxicity of DDT combined with its cumulative action and absorbability from the skin places a definite health hazard on its use," according to Dr. M. I. Smith, Dr. E. F. Stohlman and Dr. R. D. Lillie, of the U. S. Public Health Service. (*Public Health Reports,* July 28)

The symptoms DDT produces in laboratory animals strongly resemble in some respects the action of phenol, or carbolic acid. It is more than three times as poisonous as phenol to rats and possibly twice as poisonous to rabbits, the scientists found.

The effects of DDT in laboratory animals are cumulative. Small single doses given repeatedly lead to chronic poisoning. Most obvious of the symptoms are the effects on the central nervous system. These show up as overexcitability, generalized fine and coarse tremors and spasticity progressing to a flaccid type of partial paralysis of the extremities. Death from a fatal dose may often be delayed for several days.

Less obvious is the damage to the liver which, for the very reason that it does not appear so readily, may be more serious.

Although DDT is quite poisonous when absorbed by the body, it is not very readily absorbed when applied to the skin, although it is absorbed to some extent through skin. In the powder form in which it is used for delousing, it probably is not as easily absorbed as in a solution, Dr. Smith said. It may also be absorbed through the skin to some extent from clothing impregnated with the chemical.

Apparently no DDT poisoning has developed from its use in war theaters as an anti-louse and therefore anti-typhus fever weapon, nor has any trouble apparently been seen so far among those working with the chemical in its manufacture.

No Warning

But some of the very properties that make DDT so useful as an insecticide will multiply the potentional trouble. It has no warning odor or taste and when used as a liquid spray, is invisible on the sprayed surface. Yet it clings for weeks and months to clothing, to walls in dairy barns and homes, and to hides of cattle or pet animals. During this period it keeps its insect-destroying power, which is fine. If, however, it can injure food plants or animals higher in the biologic scale than insects, this will not be so good.

Tests are under way in at least two government laboratories to learn what danger DDT may hold and, if possible, how to control it so as to take the widest advantage of this strikingly effective insecticide.

Before it is widely used as an agri-

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Do You Know?

The British Association for the Advancement of *Science* is 113 years old.

Colombia is now producing enough *cement* for its own needs.

Canada has a 22% increased *wheat* acreage this year, nearly 4,000,000 acres.

Potash-containing dust from the recent eruption of Vesuvius may be sent to England for use as fertilizer.

In hot, dry countries, people sometimes carry *cucumbers* to eat and quench their thirst, as they are approximately 96% water.

Steel bottles are used to hold oxygen for high-flying air crews; the oxygen is compressed at 122 times atmospheric pressure.

Big weeds in a garden as tall as the crop plants should be cut off and not pulled, as pulling injures the roots of the crops.

Lead is being used in many civilian applications at the present time because it is one of the most available metals for non-war purposes.

Phosphorus, now used in large quantities to make smoke screens in battle areas, is an essential constituent of all tissues of the body.

Hybrid hevea *rubber plants,* resistant to South American leaf blight, have now been developed in Brazil by crossing Oriental strains with the best and most resistant Brazilian plants.

An all-cotton *gauze bandage,* recently developed, fits and clings better than ordinary gauze because of its stretchability, semi-elasticity, and roughened surface that decreases slipperiness.

Wild turkey distribution seems to indicate a definite correlation between turkey population and certain types of soil containing sufficient calcium and phosphorus occurring in "granite" soil.

Algae or green slime can be controlled in a garden pool by potassium permanganate; a teaspoonful of a saturated solution of this chemical for each gallon of water in the pool will not injure lilies or fish.

From Page 91

cultural spray, however, scientists would like to know whether the liver or other organs may be seriously damaged by eating it on vegetables and fruits. The amount on each apple or tomato would be small, but in the course of a few years, quite a lot might accumulate in the body from such sources. Suitable precautions may need to be worked out for those who handle it in manufacture or in large-scale use on mosquito-breeding places and the like.

Lethane Family

DDT, however, is only one of the new weapons chemists have given us against insect foes. Many Victory gardeners and farmers are already familiar with the Lethane family of insecticides, developed by scientists of the Rohm and Haas Company in Philadelphia. Soon they will be learning to use a new member of this anti-insect chemical group, Dithane.

Dithane is diethylene-sodium-bisdithiocarbamate. It is fatal to both chewing and sucking insects and also to another kind of crop pest, the fungi. This triple-barrelled action is combined with another unique feature. When dithane is sprayed on the ground, plants can absorb it through their roots and become immune to insect and fungi destruction. Leaves of plants will also take up dithane when sprayed in a liquid form.

What this means in terms of more food for the hungry war and postwar world is seen from field tests in which potato yields were from 25 to 100 bushels more per acre than when conventional fungus destroyers were used.

The Lethane family of insecticides are thiocyanates, as deadly to insects as the name suggests, but said to be harmless to humans and other warmblooded animals, on the basis of tests made for Rohm and Haas. At first the Lethanes were used in combination with rotenone for agricultural uses, stepping up the killing power of the rotenone to a high degree so that this war-scarce substance could be stretched to protect more and more crops. One of the newest Lethanes, however, is powerful enough to be used without rotenone, and, in fact, is more powerful against some crop-destroying pests than rotenone.

Lethane 384 Special proved itself valuable in controlling head lice in children in England's crowded schools and nurseries, and in freeing air raid shelters from these and other vermin.

It performed a real war service, according to reports from the British Ministry of Health, among women fire watchers guarding London and other English cities. Coming from all walks of life, some of these women were more fastidious about preserving the permanent waves in their hair than about the cleanliness of hair and scalp. Daily delousing of the pillows, mattresses and blankets on which they rested during their watches was impossible under war conditions. So head lice became a real problem and the British authorities are grateful to Lethane for solving it.

U. S. Authorities Skeptical

But their enthusiasm is not shared by some authorities in this country. A few experiences, not yet published, make them wonder how the British escaped serious skin and scalp injury. These same authorities also take a cautious attitude toward the Lethanes because they are cyanide-containing compounds and even the layman knows about poisonous cyanides such as hydrogen cyanide. On the other side of the picture, thousands of gallons of Lethane sprays have been used in the past several years without any reports of injury except to the insects.

The history of DDT and the other new insecticides is still in the making and will probably repeat the history of the sulfa drugs and similar weapons we use against our enemies of the insect and microscopic world. Enthusiastic reports of benefits are likely to be followed by reports of harm and, eventually, by knowledge of safe methods of use.

Science News Letter, August 5, 1944

MILITARY SCIENCE

Wool Jacket Issued to U. S. Soldiers in Europe

➤ AMERICAN soldiers fighting in Europe will be issued a new wool field jacket, made of olive drab serge.

Designed primarily for combat use, it will take the place of the enlisted men's olive drab coat which has not proved practical in actual fighting. The old coat does not leave the arms free for action and is uncomfortable.

The wool jacket has a convertible collar which may be turned up tight around the neck. It has two inside breast pockets and two outside breast pockets, adjustable shirt-type sleeves, and adjustable waist.

The War Department has ordered 4,000,000 jackets to be delivered soon.

Science News Letter, August 5, 1944

BOTANY

NATURE RAMBLINGS

by Frank Thone

Survival of the Lucky

➤ PRODIGAL production of seed is thrust upon our notice especially strikingly when trees shed their unharvested crops. City sidewalks littered thick with the winged hopes of maples and elms, suburban lawns whitened with cottonwood down as with a light snowfall, autumn woods so thick with acorns that you crunch a half-dozen of them under foot at every step, all register themselves indelibly on even the least receptive observation.

Lesser plants, too, are quite as prodigal—even more so. A grass stalk may have eight or ten leaves, but the seed-head at the top will contain from 20 to 50 or more seeds. In the cultivated grasses which we call grains this disproportion has been deliberately exaggerated by human selection and breeding. Count the grains on an ear of corn, some time when you have no more pressing occupation.

This apparently wasteful lavishness inevitably sets one to wondering why seeds are produced, anyway. The old schoolbook dictum, that the function of a seed is to produce a new plant, simply is not and cannot be true in nature. There just isn't room enough for all seeds to sprout and grow—not room enough for a billionth of them.

Taken by and large, every bit of space on earth on which a plant will grow already has a plant growing on it. If a new plant is to spring up, an old one must make way. Opportunities for large numbers of new plants at once, such as are provided by floods, forest fires, plowing, etc., are catastrophic and exceptional.

When an oak tree falls, the gap it leaves in the forest will eventually be filled by another tree, survivor of some dozens or hundreds of seedlings that started in the patch of sunlight that reached the forest floor. Yet that tree may have stood there for two or three centuries, raining millions of acorns which its own shade has kept from any chance for development. Similarly, even the shortest-lived of annual plants can be succeeded by only one plant of its own size and kind, out of the scores or hundreds that are potential in its crop of seed.

Young animals that find their birth-spot too crowded may migrate and seek less congested quarters. Darwinian survival of the fit may operate in their case. But seeds have to stay where they fall, and if that does not happen to be a suitable spot for growth no amount of innate superiority will do the young plant any good. With them, life seems to be to a very considerable extent simply a survival of the lucky.

Science News Letter, August 5, 1944

ENGINEERING

"No Smoke" Is Promise Of Postwar Home Heating

➤ A NEW COAL stove so constructed as to utilize every bit of coal that goes into it, including the gases and smoke that formerly went up the chimney, has been announced by the Bituminous Coal Institute. It does away with smoke and gas that, until now, made it necessary for American housewives constantly to wipe smudge and soot from the walls.

The new stove operates on a unique scientific principle, which combines three factors, an ample supply of air delivered at the right points by means of fan-driven jets, a series of high temperature refractory flues, and a path of travel for the gases which causes them to burn completely up. This new design gives the consumer 50% more heat from the same amount of coal and the volume of ashes is reduced about one-third.

The only evidence of smoke comes immediately after firing, and since the 100-pound coal capacity of the stove makes refueling less frequent, there is less smoke, if any at all. It will keep a four- or five-room dwelling comfortably warm for 72 hours without attention.

The stove is actually ready for production and only the release of certain critical materials is needed to place it on the market. The new unit is expected to cost around $60.

A kitchen range, incorporating the same principles of design and operation, has also been developed and should be available to the public at the same time as the stove.

Science News Letter, August 5, 1944

CHEMISTRY

Featherweight Plastic Expands An Inch a Second

➤ A NEW featherweight plastic which grows like Jack's beanstalk and is lighter than cork has been developed in General Electric's plastic laboratory in Pittsfield, Mass., for an undisclosed military use.

Lighter than rock wool, glass or cork and lower in heat conductivity than any of the three, it promises to have many peace-time applications, especially as an insulator.

The new material, whose chemical composition has not yet been disclosed, has remarkable self-raising properties. When placed in a test tube with no heat applied, the molasses-like mixture starts "growing" in less than two minutes and continues to grow at the rate of an inch a second. In ten minutes it expands 30 times its size.

Science News Letter, August 5, 1944

"GROWING" PLASTIC — Foam plastic that "grows" faster than corn promises to have many uses in insulation. Placed in a test tube in General Electric's laboratory, it begins immediately to "grow" at the rate of more than an inch a second.

AZTEC EAGLE AWARD—At the Mexican embassy in Washington, D. C., Mexico's highest award for civilians was presented to Dr. Alberto Sevilla Sacasa (left), secretary of the Nicaraguan Embassy and Dr. Harlow Shapley (right), director of Harvard College Observatory and vice president of Science Service. The Mexican ambassador, Sr. Dr. Don Francisco Castillo Najera, presented the awards in the name of his Government. The honor to Dr. Sevilla was for his contribution to cultural relations between his country and Mexico; that to Dr. Shapley was in recognition of "su inapreciable colaboracion en nuestro adelanto cientifico" (his invaluable cooperation in our scientific progress) and for his part in developing the scientific interests and activities of Mexican youth. The photograph is by Fremont Davis, Science Service staff photographer.

CHEMISTRY

Steady Light Source

➤ A NEW MODULATING light, a high-pressure mercury vapor lamp with associated controls that permits the operator automatically to adjust the light intensity to various levels for the printing of motion picture film sound tracks, has been developed by the Hanovia Chemical and Manufacturing Company, Newark, N. J. The new lamp is reported to provide a perfectly steady light source for printing sound track on the film.

The new device is designed to replace the incandescent lamps, now in use which are less efficient, and which frequently produce a hissing sound on the film track.

The new mercury arc vapor lamp, operating at 85 watts input, was designed by Lester F. Bird of the Hanovia research laboratories. It has a specially designed heater coil which permits a wide intensity of range of from 1 to 10. The heater coil prevents the vapor pressure from falling off while the lamp is being operated on low intensity. It is possible, with this arrangement, to change from low to high intensity and vice versa without any time delay.

Since the intensity of the light must change with the density of the film for accurate, clear sound printing that will reproduce well, special electronic tubes and a photoelectric cell automatically control the intensity of the light.

Science News Letter, August 5, 1944

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ENGINEERING

Sub Production Speeded By Simple Mill Operation

➤ A NEW METHOD for making strong, corrosion-resistant stainless alloy steel tubes has cut the production time about 15%. Production of the tubes, used for making submarine antenna masts, formerly caused serious bottlenecks in the overall output of U. S. Navy submarines.

A simple and ingenious mill operation introduced into the Babcock and Wilcox Tube Company's specialty tube plant makes possible the saving in production time. Company officials declined to reveal additional details of the exact process.

The antenna tubing is the largest individual piece of stainless steel tubing that has been manufactured in production quantities. The unfinished tube from which the antenna masts are made is 40 feet long, six inches in diameter, has a .600-inch thick wall, and weighs more than 1,450 pounds. It costs $1,500.

The finished antenna mast must be machined to within .002 inch and polished to a very high finish.

In order to insure that the tube will remain straight while being shipped, a special heavy wooden box was designed, with saddle-straps and cradles to keep the tube from jarring. The cost of this shipping box alone is $300. The boxes are returned to the plant for re-use.

Science News Letter, August 5, 1944

PSYCHIATRY

Gun-Shy Dogs Neurotic

Observations of 13 gun-shy dogs indicate trouble may be like war neurosis in humans. Pulse rates, breathing, and general behavior abnormal.

➤ FROM observations since the fall of 1942 on 13 gun-shy dogs and two normal ones, Cornell University scientists have concluded that gun-shy dogs are really neurotic and that the ailment is similar to war neurosis in humans.

Tested at the Cornell Behavior Farm time and again, the dogs, all contributed by sportsmen who ordinarily would shoot them because they are valueless for hunting, were found to be timid, shy, and extremely fearful. Their pulse rates, breathing, and general behavior were always abnormal, and their conditioned reflexes, established in the laboratory, were also abnormal.

The same tests, given to the two normal dogs, brought normal responses, which indicated to the scientists that the gun-shy animals lacked nervous and emotional control. They believe this is the basis pattern in both gun-shyness and war neurosis.

The research was conducted by Dr. Arthur V. Jensen under the direction of Prof. O. D. Anderson. (*See SNL,* May 29, 1943). From what he has learned of the dogs' actions, Dr. Jensen says he can tell just by looking at an animal whether it is abnormal.

The gun-shy animals feared strange objects and people, and showed inhibited movements when led on a leash. Some tended to avoid people completely and others would do anything to be petted. There were no evidences or records of harsh treatment in early life or a previous environment to suggest causes for this behavior.

One sign of abnormal behavior was the absence of normal curiosity. A normal dog, brought into a strange room, for example, shows immediate interest by exploring each corner and sniffing at objects in the room. The gun-shy dog crouches in one spot and does not move. Sportsmen who sent this kind of dog for study said the animals feared not only the sound of guns but also other loud or sudden noises, such as the backfire of a car or the roll of thunder.

One dog's pulse rate was more than 200 a minute, compared with the normal 60 to 90 beats a minute. Most of the gun-shy animals had rates between 150-200.

All exhibited the symptoms often described in cases of war neuroses, but the Cornell workers do not suggest an analogy. It is known that persons with war neuroses are marked by over-sensitivity to loud noises, inhibitory phenomena, irritability, and disturbances of the automatic nervous system, which regulates visceral activity and glandular secretions.

Science News Letter, August 5, 1944

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Science News Letter, August 5, 1944

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Science News Letter, August 5, 1944

⚙ *MOBILE clothing store, in a large six-wheel truck, is serving 20 mining communities in three counties in one coal area. It carries 100 suits for men, 150 dresses and a line of suits for women, and other clothing used by miners and their families. A war expedient, it conserves workers' time.*

Science News Letter, August 5, 1944

⚙ *ATOMIZER, for use with disinfectants and insecticides, may be attached to the ordinary electric fan. It consists of a hood to collect and concentrate the air put in motion by the blades, and direct it through a nozzle over the tube which extends downward into the liquid.*

Science News Letter, August 5, 1944

⚙ *MECHANICAL DEVICE tests and automatically certifies the hardness of sheet metal rapidly and accurately. Sheets to be tested are fed under a vertical electrically-operated indentor point. If a sheet is up to the hardness for which the machine is set, an electric contact is closed,*

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⚙ *COLD CHAMBER, or refrigerator, 80 feet long, 25 feet wide and 25 feet high, used by the Army for low-temperature tests of internal combustion engines and other equipment, is large enough for an entire fuel servicing truck. It can be operated at temperatures as low as 70 degrees below zero Fahrenheit.*

Science News Letter, August 5, 1944

⚙ *RESILIENT HEEL for a lady's shoe has a layer of rubber-like material under the leather lift or lower layer of the heel. The rubber-like material extends through a hole in the center of the lift to the floor, and also upward through the heel and the inner sole of the shoe where it has a flat, spreading head.*

Science News Letter, August 5, 1944

⚙ *INTERNAL combustion engine, designed for aircraft and recently patented, looks like a six-sided steel doughnut. It contains six elbow cylinders, each with a pair of oblique-faced pistons opposed to each other at the bend where the firing chamber is located. Sprocket wheels in the middle of the six sides engage a continuous chain belt to pick up the power.*

Science News Letter, August 5, 1944

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